

Submission from Students  
At McKinney Boyd High School

Topic – Fluoridation of the Public Water Supply

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## Fluoride in Water

The introduction of fluoride into public water systems was first initiated in the 1940s due to the beneficial effects on teeth. Countries that fluoridate their water include: United States, Ireland, United Kingdom, Canada, and a few others. Several countries that previously fluoridated their water but stopped include: Japan, Germany, Sweden, Finland, Soviet Union, Netherlands, and Czechoslovakia. As time goes on more and more places are making the change back to water without fluoride due to advancements in dental care, the amount of fluoride in food, the need for topical use instead of consumption, and the correlation of countries that don't fluoridate their water and the number of cavities they have. The recommended daily intake of fluoride is 0.25-1.0 mg (less than what can be found in one strip of toothpaste). Now that fluoride is so abundant in other sources the need for fluoridating McKinney's water is reduced drastically.

### 1. Many Children Exceed Recommended Fluoride Intake from Toothpaste Alone

For many children, fluoride toothpaste is the largest source of fluoride intake. One strip of fluoridated toothpaste on a child-sized toothbrush contains between 0.75 and 1.5 mg of fluoride, which is more fluoride than is found in many prescription fluoride supplements (0.25 to 1.0 mg per tablet). Since young children are known to swallow a large amount of the toothpaste they place in their mouth, use of fluoride toothpaste – particularly when done without the supervision of a parent – can result in dangerous levels of fluoride exposure. Ingestion of excessive fluoride toothpaste is a major risk factor for dental fluorosis, and can cause symptoms of acute fluoride toxicity (e.g., stomach pain, nausea, etc).

As noted by Dr. Stephen Levy, two-to-three year old children ingest an average of 0.3 grams of toothpaste per brushing, which equates to 0.3 to 0.45 mg of fluoride. (Levy 1993). At two brushings per day, the average two-to-three year old would ingest between 0.6 and 0.9 mg of fluoride from toothpaste each day. Some children who brush twice a day will swallow far more than this. Research has found, for example, that 10% of children swallow more than double the “average” amount. Among these children, fluoride ingestion from toothpaste will range up to 2mg per day.

## 2. Advancements in Dental Care and Food (with fluoride) since the Introduction of Fluoride into Public Water Supply

- Amount of fluoride in Colgate Phos-fur Fluoride Toothpaste – 1.1% sodium fluoride.
- People can benefit from fluoride treatments instead of having to drink fluoridated water.
- The benefit of fluoride is topical, which means we don't have to ingest fluoride for it to work, we just have to apply it to your teeth.
- There has been an increase in amounts of naturally-occurring fluoride in processed foods and beverages. This increase means that the amount of fluoride we are ingesting with fluoridated water is going up as whole, which means more body problems for us.

The ability to have new fluoride treatments at a dentist office and have more readily accessible sources of fluoride in our everyday foods and beverages gives us more than enough fluoride that is required every day. Also, with the available toothpastes and mouthwashes, each person can do their own part to make sure they keep their teeth protected and pearly white. Fluoride is effective on a topical field, and ingesting it does nothing more than cause bodily problems. While fluoridated water is better than nothing at all, with the new advances in dental care and increased amounts of fluoride in everyday foods and beverages the need for fluoridated water is fading as we look towards a healthier alternative.

[http://lynnfielddental.com/services/fluoride\\_treatment](http://lynnfielddental.com/services/fluoride_treatment)

<http://www.colgate.com/app/Colgate/US/OC/Products/FromTheDentist/PhosFlurGelAndRinse.cvsp>

NRC (2006). National Research Council of the National Academies, *Fluoride in Drinking Water: A Scientific Review of EPA's Standards*. Washington, DC: National Academies Press.

### 3. Systemic vs. Topical Application of Fluoride

Quotes from research studies – source included below.

“It was always assumed that fluoridated drinking water had systemic benefits with respect to dental caries. Unfortunately, not a single, well-controlled water fluoridation study has ever been conducted to determine just how much of the anti-caries effect was from ingested fluoride (the pre-eruptive, systemic theory) and how much of the anti-caries effect was from fluoride interacting with the tooth surfaces after tooth eruption (the topical theory).”

“Importantly, this means that fluoride incorporated during tooth mineral development at normal levels of 20 to 100 ppm (even in areas that have fluoridated drinking water or with the use of fluoride supplements) does not measurably alter the acid solubility of the mineral. Even when the outer enamel has higher fluoride levels, such as 1,000 ppm, it does not measurably withstand acid-induced dissolution any better than enamel with lower levels of fluoride. Only when fluoride is concentrated into a new crystal surface during remineralization is it sufficient to beneficially alter enamel solubility. The fluoride incorporated developmentally – that is, systemically into the normal tooth mineral – is insufficient to have a measurable effect on acid solubility.”

“Laboratory and epidemiologic research suggests that fluoride prevents dental caries predominately after eruption of the tooth into the mouth, and its actions primarily are topical for both adults and children.”

“It is no longer acceptable to use fluoride supplements on large populations, even if the caries rate is higher than average.”

“Supplying fluoride in large amounts after the teeth erupt in the oral cavity (i.e., aimed at depositing fluorapatite in the outer layers of the enamel) has not proven to give sufficient long-term protection against a cariogenic attack. Preventive therapies should, on the contrary, be based on the modern understand of the mechanism of action. Fluoride rinses, lacquers, and the use of fluoride toothpastes cause an elevation of the fluoride levels in the oral fluids, at which level the dynamic pattern of demineralization and remineralization have been shown to be affected. Semiannual topical treatments seem particularly useful in those individuals who have shown a high caries activity.”

“It is generally postulated that a fluoridated apatite is the most desirable product of topical treatment and that the effectiveness of a topical agent is proportional to its ability to deposit fluoride as fluorapatite in the enamel. ... Nearly all presently available fluoride agents are based on this concept. However, only a very moderate increase in the firmly bound fluoride is obtained with these agents. ... Such small amounts of apatitically-bound fluoride as are deposited in the enamel after topical treatment are unlikely to account for the large cariostatic effect. Recently, it was found that even shark enamel, containing nearly

exclusively fluorapatite, had a limited resistance against caries attacks in an intra-oral human caries model.”

“What is important is that an increase in fluoride in the treatment solution does not mean a directly proportionally larger effect. The calculated percent protection afforded by fluoride in the treatment solutions. According to these calculations, a fluoride concentration of 62 mg/L (3.3 mmol/L) would provide 80% protection and 178 mg/L (9.4 mmol/L) would give 90% protection. Although these values are based on an in vitro model and cannot be directly translated to the oral environment, the results indicate that near-optimum fluoride effects can readily be achieved with quite low concentrations in a daily fluoride rinse regimen.”

Therefore, there is limited scientific data to support the assertion that systemic fluoride treatment should be initiated from shortly after birth.

[http://www.keepers-of-the-well.org/effectiveness\\_pdfs/Topical\\_vs\\_Systemic.pdf](http://www.keepers-of-the-well.org/effectiveness_pdfs/Topical_vs_Systemic.pdf)

“Nearly 90 percent of cavities in school children occur in the surfaces of teeth with vulnerable pits and grooves, where fluoride is least effective.”

Facts from the National Institute of Dental Research. *Marshall Independent* Marshall, Minnesota. May 28, 1992.

“The program focused on four caries-prevention techniques: sealants, a plastic-like coating applied to the chewing surfaces of back teeth and to pits and fissures on the sides of teeth (these surfaces are most prone to decay and ones which fluorides cannot protect adequately)”.

Dental study upsets the accepted wisdom. *Science News*. Vol. 125, No. 1. Jan.7, 1984.

“It is estimated that 84% of the caries experience in the 5 to 17 year-old population involves tooth surfaces with pits and fissures. Although fluorides cannot be expected appreciably to reduce our incidence of caries on these surfaces, sealants can.”

Preserving the perfect tooth. Editorial. *Journal of the American Dental Association*. Vol. 108. March 1984.

“The type of caries now seen in British Columbia’s children of 13 years of age is mostly the pit and fissure type. Knudsen, in 1940, suggested that 70 percent of the caries in children was in pits and fissures. Recent reports indicate that today, 83 percent of all caries in North American children is of this type. Pit and fissure cavities aren’t considered to be preventable by fluorides, they are prevented by sealants.”

Fluoridation: Time For A New Base Line? A.S. Gray, DDS, FRCD(C), *Journal of the Canadian Dental Association*. No. 10, 1987.

4. Research that shows nations or cities that have either never added fluoride or stopped adding fluoride do not have a greater amount of tooth decay.

Tooth decay trends tracked by the World Health Organization from 1970 to the present show that the incidence of decayed, missing or filled teeth has been steadily in decline with each passing year in the U.S., France, Germany, Japan, Italy, Sweden, Finland, Denmark, Norway, The Netherlands, Northern Ireland, Austria, Belgium, Portugal, Iceland and Greece. And why are the numbers of decayed teeth on the decline? Better oral hygiene and improved dental practice is the most obvious answer. It's certainly not the fluoride. Because of all of those countries, only one adds fluoride to the public water supply: the United States.

U.S. Public Health Service documents show that even in 1991, non-fluoridated communities were already receiving equal to and more than the targeted fluoride dosage of 1 mg per day. Fluoridated communities were receiving an estimated 3 to 7 times the “optimal” goal.

The Canadian Dental Association went even further, stating that fluoride’s effect on caries is topical, rather than systemic, and recommended that if a child brushes his/her teeth twice a day with fluoridated toothpaste that they should have no further exposure to fluoride even in a non-fluoridated community.

A study sampling 280,000 children in Massachusetts, and another sampling 151,000 children in New York, reported a doubling of the risk of lead levels in children’s blood rising above the danger level of 10 micrograms per deciliter when the hazardous wastes from the phosphate fertilizer industry are used for fluoridation, rather than sodium fluoride or no fluoride at all.

## Conclusion

As you have seen with the research we have gathered, the need for fluoridation in our water is not as necessary as it used to be. With improved healthcare, and the alternate ways we get fluoride, such as toothpaste and mouth washes, we no longer need to fluoridate our water. Although fluoride is proven to reduce tooth decay, and you may think that more is better, that is false. The use of too much fluoride can actually result in long term health effects, such as dental fluorosis and some studies have even shown the fluoride to cause cancer and damage to the thyroid. Many countries and cities have stopped water fluoridation, and they have seen no evidence of increased tooth decay because of the change. Because of the major advancements in dental care and a number of various ways to receive fluoride on a daily basis, we no longer need to continue to fluoridate our water.