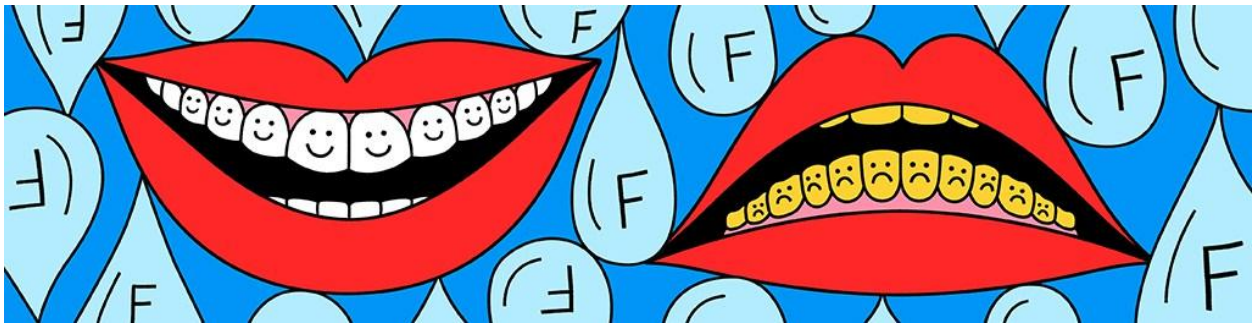

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Are The Concerns About Water Fluoridation Legit?

By Emily Oster
Dental Health

If you're anything like me, you have probably given only limited thought to the fluoride in your tap water. You probably have some vague idea that it's there and that it relates to your dental health. But community water fluoridation is a fairly controversial practice. Some cities (Portland, Oregon, for example) have blocked the introduction of fluoride, and numerous advocacy groups call for its elimination all together.

Those who support water fluoridation — a group that includes the Centers for Disease Control and Prevention, the American Academy of Pediatrics and the American Dental Association, among others — say it is a safe, effective way to improve dental health. The CDC even highlights it as one of the top 10 public health achievements of the 20th century.

Opponents disagree, to put it mildly. One central objection relates to a general distrust of government and concern about forced "medication" of the population. One does not need to go too far down a list of Google hits on "fluoride in water" to find an article that suggests water fluoridation is a mind control system derived from Nazi research. Needless to say, there is no evidence that fluoride can be used for mind control. (Of course, that is what I would say if I were under mind control, so it's a difficult case to disprove.)

But the more concrete objections relate to a concern that the benefits of fluoride are not very large given its potential health risks — reductions in IQ and increased risk of cancer, among other things.

Are these risks real?

The purported benefit of water fluoridation is fewer cavities. You also get fluoride in your toothpaste, but reliable tooth-brushing is not universal, and delivering fluoride through tap water is a way to ensure some universal exposure. When water fluoridation was introduced around the 1950s, early studies suggested a 50 percent to 70 percent reduction in cavities among children. These effects are enormous.

Opponents argue, however, that even if this was a good policy 60 years ago, it is not useful anymore, as dental health has generally improved and most toothpaste contains fluoride directly. But while it is certainly true that these benefits have declined over time, they are still big. A review covering the 1980s suggested a 15 percent to 60 percent reduction in cavities, depending on the age group. Among a small number of studies focusing on children in the 1990s in the U.S., cavity reduction rates were in the range of 15 percent to 25 percent. In other words, the evidence pretty clearly suggests that putting fluoride in tap water improves dental health.

But this doesn't necessarily mean it's a good idea — the real question is whether opponents are right that the health risks outweigh the health benefits.

One risk that everyone agrees upon is dental fluorosis. While teeth are developing under the gums — i.e. before children are 8 years old or so — a high exposure to fluoride can produce this condition. Dental fluorosis produces discoloration of the teeth, in mild cases in the form of shiny white stains and in severe cases in the form of brown stains. Since fluoridated water is a major source of fluoride, it does contribute to dental fluorosis (so does your kid swallowing toothpaste). The condition is cosmetic and in most cases not noticeable (when writing this article I inspected my teeth and found that, in fact, I have some of this) but it is probably a risk worth knowing about. The bigger issues raised with fluoride are increased risks of cancer and low IQ.

There is a hypothesis that fluoride in water increases the risk of osteosarcoma (bone cancer). This appears to arise from some suggestive evidence in mice. In humans, however, there seems to be no such effect. A recent study from Great Britain shows no relationship between fluoride levels and bone cancer rates, as does another study from the United States. Older review articles say the same.

The second significant concern is that fluoride interferes with neurodevelopment and lowers children's IQ. This is not quite as easy to dismiss. A 2012 National Research Council meta-analysis of studies that compared children in high-fluoride and low-fluoride areas concluded that fluoride exposure significantly lowered IQ. The effect in this study is reasonably large. The National Research Council gives some credence to these studies, arguing that more research should be done.

These studies, however, must be taken with a grain — maybe even a whole box — of salt. They largely rely on data from China, and the variation in fluoride levels there arises not from community water fluoridation but from natural variation in the water's fluoride levels. The biggest issue is that the "high" fluoride levels are much, much higher than you'd see in the United States. In fact, the *low* fluoride level group in these studies has a level similar to what is typical in the U.S. for tap water. So even if we take the conclusions of these studies at face value, it is not at all clear whether they apply to the U.S.

More reassuring, studies that more closely approximate the U.S. experience — for example, one in New Zealand — do not show any impacts of fluoride on IQ. This study is of higher quality in general, with IQ testing at multiple ages and a more well-defined methodology.

The bottom line is that if you want to build a case against water fluoridation — and, apparently, many people do — it is possible to do so. But the case is weak. The risks are small, and the public health benefits are big. The evidence simply doesn't favor stopping this practice, nor does it favor blocking it from starting — unless that's the mind control talking.

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