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Government Panel Raises Concern About Fluoride

National Academy of Sciences Calls Current Ceiling Unsafe; Monitoring Your Local Supply

By SHARON BEGLEY

A PANEL OF THE National Academy of Sciences concluded yesterday that the maximum amount of fluoride currently allowed in the nation's drinking water can cause health problems and "should be lowered."

The report concluded that children exposed to four milligrams of fluoride per liter, the highest allowable level, risk developing severe dental fluorosis, in which teeth become mottled, pitted and scarred. Because fluoride can weaken bones, people who consume water containing that much fluoride over a lifetime are likely to be at increased risk for bone fractures.

Only 200,000 people in the U.S. live in places where water has fluoride levels of at least 4 mg. But an additional 1.4 million live where the concentration is at least half that, a level that can produce mild to moderate dental fluorosis. Most are in South Carolina, but there are thousands in Texas, Oklahoma and Virginia as well.

Fluoride levels as high as 4 mg are caused by natural rock and soil formations, not by the addition of fluoride to water. The government's recommended level for fluoride deliberately added to prevent cavities is only 0.7 to 1.2 milligrams per liter.

Still, the report will likely fuel debate in communities considering whether to add fluoride to their water. While it didn't address the 60-year controversy over whether it is safe to add fluoride to drinking water to prevent tooth decay, it is the latest development in a number of recent findings that have changed the thinking about fluoride.

Fluoride in moderation is known to strengthen teeth, but views have changed on how best to get it. While scientists used to believe that the bene-

fits occurred mostly when people ingested fluoride so it circulated in their blood, a spate of new studies suggests that topical exposure (through toothpaste, gels and fluoride applications at a dentist's office) is equally important, if not more so. Overall, drinking fluoridated water cuts the rate of tooth decay 18% to 40%, according to a 2001 analysis by the U.S. Centers for Disease Control and Prevention—which translates into fewer than one decayed tooth surface per person.

Consumers can learn how much fluoride is in their tap water by asking their local utility. Those with high fluoride levels can reduce fluoride exposure

Fluoride Fears

- About 200,000 people live where water has fluoride levels of at least **4 mg per liter**, a level thought to carry risks.
- An additional 1.4 million people live where natural concentrations are between **2 and 3.9 mg** per liter.
- Children exposed to the highest allowed levels risk developing **fluorosis**, in which teeth are discolored and scarred.
- People who consume water with elevated fluoride over a lifetime are likely at increased risk for **bone fractures**.

by using home water-filtration systems, which vary in their ability to remove fluoride from 13% to 99%, the committee found. So-called reverse-osmosis systems are the most effective at removing fluoride.

Worries about fluoride could increase demand for bottled water. That can have fluoride, too, but the limits for naturally occurring fluoride are lower. About 20 bottled-water makers add fluoride to some of their brands, including those in home and office coolers. Federal law limits fluoride in bottled water to 1.4 to 2.4 mg per liter if none is added by the bottler (as when the water comes from an already fluoridated source), and to 0.8 to 1.7 mg per liter if fluoride is added at the bottling plant. The range reflects the climate where the water is sold, with lower allowable levels in hotter regions. The label doesn't have to indicate fluoride content if the bottler doesn't add it.

There is no way, short of taking a bone sample, to unequivocally determine one's cumulative exposure to fluoride. It isn't possible to remove fluoride from the body as can be done for lead and other heavy metals. But "if you stop exposure, it will very gradually come out of the bone," committee member Thomas Webster of Boston University said.

While the panel called for the fluoride safety limit to be lowered, it is likely to take years before that might happen. For now, the panel's recommendation is that the Environmental Protection Agency, which requested and paid for the study,

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conduct a new risk assessment to determine how much lower the maximum fluoride level should be. If such a risk assessment agrees with the academy panel that four mg per liter is too high, the EPA could then use enforcement provisions of the Safe Drinking Water Act to compel water utilities to reduce fluoride levels.

A separate study to be published next week concludes that fluoride raises the risk of osteosarcoma, a rare bone cancer, especially in boys. Among boys drinking water with 30% to 99% of the 1 mg per liter fluoride level recommended for preventing cavities, the risk of osteosarcoma was estimated to be five times as great as among boys drinking nonfluoridated water. At one mg per liter or more, the risk was an estimated seven times as high. But because only 400 or so cases of osteosarcoma are diagnosed annually in the U.S., the absolute risk of the disease remains very low.

Other studies have shown no link between fluoridation and cancer. The national science panel called the evidence for osteosarcoma "tentative and mixed," because the studies as a whole do "not clearly indicate that fluoride either is or is not carcinogenic in humans." But because the hypothesis is biologically plausible—fluoride is known to accumulate in bone tissue and causes bone cells to proliferate, and animal data suggest it is carcinogenic—the committee concludes that "fluoride appears to have the potential to initiate or promote cancers, particularly of the bone."

The thoroughness of the report impressed even advocates of fluoridation. "It's an excellent piece of research," says John Stamm of the University of North Carolina School of Dentistry, a spokesman for the American Dental Association. "A number of jurisdictions [weighing fluoridation] have been waiting for this report." But Dr. Stamm said fluoride should be used "for reducing tooth decay," and its "accumulated safety and benefits level is quite remarkable."

In a surprise to even some longtime fluoridation opponents, the committee expressed concern about the effect of fluoride on IQ, noting that the "consistency of study results appears significant enough to warrant additional research" on the question. IQ deficits, the committee noted, have been strongly associated with dental fluorosis, in which teeth become scarred and weakened and develop yellow and brown mottling during the years teeth are forming. But the existing data are "not adequate" to say for sure whether fluoride can impair IQ.

One immediate effect of the report will be felt in communities that are weighing fluoridation. As of 2000, 162 million Americans have artificially fluoridated water. In recent years, local decisions on fluoridation have broken roughly 50-50. Antifluoridation advocates see the report as their strongest weapon ever.

"When one couples the risks with the lack of understanding on what the safe doses are for neurotoxic and other effects, it should cause a great deal of concern," says Michael Connert of the Fluoride Action Network, a nonprofit group that opposes fluoridation.