Fluoride's REVENGE

Has this cure, too, become a disease?

BY DANIEL GROSSMAN

Terry Rich, a Colorado Springs dentist, recently treated Molly, a teen-aged patient, for an ugly brown stain on her front teeth. "She was dissatisfied with her teeth," he recalls, noting that dark brown horizontal lines marred an otherwise straight smile. Though his acid-etching treatment failed to remove the stain, Rich hopes to try again with a different formula. Molly is Rich's own child. Like his other two daughters, Elizabeth and Ruth, and hundreds of thousands of other people across the nation, she suffers from dental fluorosis, an ailment caused by excessive levels of the chemical fluoride in naturally mineral-rich water.

An investigation of the health effects of fluoride, including two Freedom of Information Act requests that pried loose more than 10,000 pages of documentation, shows that a Government regulation intended to prevent fluorosis was derailed by a decades-old controversy between two agencies over a legally unrelated Government policy.

Officials at the Public Health Service, the Federal Government's all-purpose health agency, stopped the Environmental Protection Agency from issuing a standard for chemicals. Though dental fluorosis is hardly a life-threatening ailment, this story demonstrates how a powerful agency, intent upon enforcing its own view of the public good, can suppress anyone who gets in its way.

On October 31, 1985, employees of the EPA were circulating a memo written by Paul Price, a staff member in the regulatory agency's drinking-water program. It was a spoof of an official press release issued that day to announce a new regulation.

"The Office of Drinking Water," it began, "proudly presents their new improved FLUORIDE REGULATION, or 'How We Stopped Worrying and Learned to Love Funky Teeth.' " The takeoff reflected the frustration felt by staff members who had invested years in developing the protective regulation only to see it diluted because of pressure from another agency.

Though fluoride is best known as the chemical added to drinking water and toothpaste to prevent tooth decay, it can also cause a variety of harmful ailments, including one that puts brown stains on teeth and may make them brittle and crumbly. The amount of fluoride added to drinking water to prevent tooth decay is about the same as the amount that can cause moderate staining.

Such staining, known as dental fluorosis, was discovered even before the beneficial effects of fluoride were recognized. The convoluted history of fluoride—perhaps one of America's most bizarre encounters with a chemical contaminant—holds the secret to why two agencies, each ostensibly concerned about the effects of fluoride on teeth, should clash.

Dental fluorosis was first noted in Colorado Springs at the turn of the century by a young dentist who became obsessed with discovering the cause of the disease, then known as "Colorado Stain." When minute amounts of fluoride dissolved in drinking water were identified as the culprit in 1931, the Public Health Service dispatched H. Trendly Dean, a talented epidemiologist, to determine the concentration at which the disease occurs.

"In moderate cases, all enamel surfaces of the teeth are altered," Dean wrote. "Brown stain is frequently a disfiguring feature." In severe cases, he added, "brown stains are widespread and teeth often present a corroded-like appearance." The disease, researchers later discovered, is caused in children up to the age of eight during the formation of their teeth.

Fluoride would probably be treated today with the same degree of concern as any other contaminant that affects human health, were it not for the fact that Dean also confirmed an observation that changed the course of preventative health care. He showed that people with dental fluorosis had fewer cavities—then considered a public-health scourge. This discovery was greeted with enthusiasm by activists in the dental community, especially in Wisconsin, a stronghold of the Progressive movement, where a small group of energetic dentists campaigned vigorously to add fluoride to drinking water.

Dean and his agency were more circumspect, as were the American Dental Association and the American Medical Association, which preferred to await the results of investigations of the benefits of fluoride. But by the mid-1940s, a few communities began experimenting with fluoridation—as the process of adding fluoride came to be known. By 1950, the Public Health Service, under increasing pressure from advocates, endorsed the process.

As a full-blown campaign to fluoridate the entire country—nourished by the once-skeptical Public Health Service—began to build, grassroots opposition appeared as well. Some critics questioned the safety and efficacy of fluoridation, and others raised ethical, moral, and philosophical objections to the injection of a potent
The struggle over fluoride regulation is a clash of two different cultures.

One side is rooted in the 1950s: Health problems are solved with medication, and doctors know best.

The other side, environmental scientists, says nothing should be allowed in drinking water unless its safety can be proven.

Nevertheless, EPA was besieged by petitions from state governors and dental officials to weaken the standard or, better yet, replace the legally binding regulation with a less burdensome, voluntary standard. But voluntary standards are typically ignored.

Dental and other public-health officials opposed the binding rule because they feared EPA would encourage the antifluoridation camp and hinder the ongoing effort to fluoridate the entire country. EPA's plans to regulate fluoride, said John Daniel, a dental official in South Carolina, "served only to stimulate ardent antifluoridationists in their fanatic quest to associate fluoride with every disease and unpleasantness known to mankind."

But many members of the medical community are cautiously beginning to question forty years of doctrinaire advocacy of fluoridation. Even Public Health Service officials are noting today that fluoride may not be as effective as they once claimed. "Perhaps we have been too much the crusaders," says Canadian dental official Alan Gray in calling on his colleagues to reconsider the benefits of fluoridation.

State governments opposed the binding regulation for another reason: because defluoridation is expensive and therefore politically unpalatable. According to EPA estimates, for instance, a typical family in a community that installed defluoridation equipment could expect an increase in its water bill of between $20 and $100 annually.

EPA staff scientists were convinced of the need to prevent fluorosis. "This was the only contaminant up to this time that we knew had a human health effect," recalls David Schnare, an EPA drinking-water analyst. Other drinking-water contaminants, he explains, were recognized by the results of animal studies only.

The controversy over fluoridation is no longer as visible as it was in the 1950s, but it continues. The Public Health Service is still trying to make fluoridation universally available, and opponents are still at work with roadblocks and sandbags. Today, proponents note with alarm that fluoridation was actually rejected in about 100 of the more than 150 referendums on the measure in the past decade. With only two-thirds of the public water supplies served by what dentists consider the optimal level of fluoride today, the longstanding Public Health Service goal of 95 per cent by 1990 was recently lowered to 75 per cent by the year 2000.

Though many beneficial chemicals are dangerous when consumed at excessive levels, fluoride is unique because the amount that dentists recommend to prevent cavities is about the same as the amount that causes dental fluorosis. The Public Health Service recommends that about one part of fluoride be added for every million parts of water to prevent tooth decay—the amount depends on the climate—while the Environmental Protection Agency says water with as little as 0.7 parts per million of fluoride can cause moderate dental fluorosis in a small percentage of the people who drink it.

Today, according to the EPA, there are 1,300 communities—mostly rural towns—serving nearly two million people with water naturally enriched with fluoride in concentrations greater than two parts per million (ppm). And there are 200 communities serving more than a quarter-million people with water exceeding four ppm. At two ppm, according to agency studies, 10 per cent of all children will contract either moderate or severe fluorosis. At four ppm, nearly half the children will be afflicted. The Public Health Service estimates that nearly half a million American schoolchildren suffer from mild or severe dental fluorosis.

The EPA issued a regulation to protect the public from dental fluorosis in 1977, under authority of the then newly enacted Safe Drinking Water Act. The rule prohibited public water suppliers from distributing water with more than two ppm of fluoride, though the deadline for compliance extended until 1984. As the deadline neared, however, none of the offending suppliers moved to comply, since defluoridation equipment costs hundreds of thousands of dollars. Instead, EPA came under increasing pressure to reconsider the rule. The regulation was a temporary standard, promulgated hastily with the expectation that the agency would later issue a permanent rule based on further deliberations.

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before asked the Surgeon General to conduct such a review of a chemical, nor has it since.

Koop's office assembled a committee of dental researchers in various branches of the Service. Completed in 1982, their report concluded that dental fluorosis, though "cosmetically objectionable," is not a health hazard. Summarizing the report, Koop wrote to EPA: "No sound evidence exists which shows that drinking water . . . in the U.S. has an adverse effect on dental health."

Public Health Service documents verify that the wording of Koop's letter was intended to hinder EPA plans to set a binding fluoride standard. Unless EPA demonstrates that a contaminant has a "health effect," the agency cannot legally set a binding standard.

"If we send this letter," Koop explained in a memo to Edward Brandt, his superior in the Public Health Service, "it means that [EPA] would not be able to publish [binding] drinking-water regulations." Then he advised, "I think we should go with this letter, in spite of the fact that EPA will not like our response."

Still eager to demonstrate the need to regulate fluoride, the EPA asked the Surgeon General to assemble another panel in 1983, this time to consider the nondental effects of fluoride. A transcript of the panel's two-day meeting shows that, despite its nondental mandate, the panel was especially disturbed by what it learned about dental fluorosis. "You would have to have rocks in your head to allow your child much more than two parts per million," said Stanley Wallach, then medical-service chief of the Veterans Administration Medical Center in Albany, New York.

In the final draft of its report, panel chair Jay Shapiro concluded, "There was a consensus that . . . dental fluorosis per se constitutes an adverse health effect that should be prevented." Shapiro wrote a memo warning that "because the report deals with sensitive political issues which may or may not be acceptable to the PHS,
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In Colorado Springs, where dental fluorosis was first studied almost a century ago, fluoride levels today reach nearly four ppm. Dentist Terry Rich thinks this level is too high. though he concedes the city couldn't afford a treatment plant even if regulators required it.

And he views the high level of fluoride in the city's water as an opportunity for business. It could be a money-making thing in my practice," he says, musing about treatment for people suffering from dental fluorosis—"it's the only way I could figure out a way to do it."