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The Health Impacts of Fluoridated Water. « Shaky Science »

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One of our pet peeves is when erroneous groupthink persists even in the face of contradictory evidence.

As shown below, water fluoridation is based on very shaky science. And yet – despite the science – the big dental associations in the U.S. and other countries continue to push it as safe and effective.

The Guardian reported last week:

> Health experts are calling for a moratorium on water fluoridation, claiming that the benefits of such schemes, as opposed to those of topical fluoride (directly applied to the teeth), are unproved.
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> Stephen Peckham, director and professor of health policy at Kent University's centre for health service studies, said: "Water fluoridation was implemented before statistics had been compiled on its safety or effectiveness. It was the only cannon shot they had in their armoury. It gets rolled out, becomes – in England – policy and then you look for evidence to support it.
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> "The fat debate [whereby fat used to be the big enemy in food before that was revised] is an example of evidence getting built up to support a theory. It's a dental health policy that's got up a head of steam and people have been reluctant to see it criticised.
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> "You can't really confidently say that water fluoridation is either safe or effective.

Newsweek reported last June:

> You might think, then, that fluoridated water's efficacy as a cavity preventer would be proven beyond a reasonable doubt. But new research suggests that assumption is dramatically misguided; while using fluoridated toothpaste has been proven to be good for oral health, consuming fluoridated water may have no positive impact.
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> The Cochrane Collaboration, a group of doctors and researchers known for their comprehensive reviews—which are widely regarded as the gold standard of scientific rigor in assessing effectiveness of public health policies—recently

set out to find out if fluoridation reduces cavities. They reviewed every study done on fluoridation that they could find, and then winnowed down the collection to only the most comprehensive, well-designed and reliable papers. Then they analyzed these studies' results, and published their conclusion in a review earlier this month.

The review identified only three studies since 1975—of sufficient quality to be included—that addressed the effectiveness of fluoridation on tooth decay in the population at large. These papers determined that fluoridation does not reduce cavities to a statistically significant degree in permanent teeth, says study co-author Anne-Marie Glenny, a health science researcher at Manchester University in the United Kingdom. The authors found only seven other studies worthy of inclusion dating prior to 1975.

The authors also found only two studies since 1975 that looked at the effectiveness of reducing cavities in baby teeth, and found fluoridation to have no statistically significant impact here, either.

The scientists also found "insufficient evidence" that fluoridation reduces tooth decay in adults (children excluded).

"From the review, we're unable to determine whether water fluoridation has an impact on caries levels in adults," Glenny says. ("Tooth decay," "cavities" and "caries" all mean the same thing: breakdown of enamel by mouth-dwelling microbes.)

"Frankly, this is pretty shocking," says Thomas Zoeller, a scientist at UMass-Amherst uninvolved in the work. "This study does not support the use of fluoride in drinking water." Trevor Sheldon concurred. Sheldon is the dean of the Hull York Medical School in the United Kingdom who led the advisory board that conducted a systematic review of water fluoridation in 2000, that came to similar conclusions as the Cochrane review. The lack of good evidence of effectiveness has shocked him. "I had assumed because of everything I'd heard that water fluoridation reduces cavities but I was completely amazed by the lack of evidence," he says. "My prior view was completely reversed."

"There's really hardly any evidence" the practice works, Sheldon adds. "And if anything there may be some evidence the other way." One 2001 study covered in the Cochrane review of two neighboring British Columbia communities found that when fluoridation was stopped in one city, cavity prevalence actually went down slightly amongst schoolchildren, while cavity rates in the fluoridated community remained stable.

Overall the review suggests that stopping fluoridation would be unlikely to increase the risk of tooth decay, says Kathleen Thiessen, a senior scientist at the Oak Ridge Center for Risk Analysis, which does human health risk assessments of environmental contaminants.

"The sad story is that very little has been done in recent years to ensure that fluoridation is still needed [or] to ensure that adverse effects do not happen," says Dr. Philippe Grandjean, an environmental health researcher and physician at Harvard University.

The scientists also couldn't find enough evidence to support the oft-repeated notion that fluoridation reduces dental health disparities among different socioeconomic groups, which the CDC and others use as a rationale for fluoridating water.

"The fact that there is insufficient information to determine whether fluoridation reduces social inequalities in dental health is troublesome given

that this is often cited as a reason for fluoridating water," say Christine Till and Ashley Malin, researchers at Toronto's York University.

Studies that attest to the effectiveness of fluoridation were generally done before the widespread usage of fluoride-containing dental products like rinses and toothpastes in the 1970s and later, according to the recent Cochrane study. So while it may have once made sense to add fluoride to water, it no longer appears to be necessary or useful, Thiessen says.

It has also become clear in the last 15 years that fluoride primarily acts topically, according to the CDC. It reacts with the surface of the tooth enamel, making it more resistant to acids excreted by bacteria. Thus, there's no good reason to swallow fluoride and subject every tissue of your body to it, Thiessen says.

Another 2009 review by the Cochrane group clearly shows that fluoride toothpaste prevents cavities, serving as a useful counterpoint to fluoridation's uncertain benefits.

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"I couldn't believe the low quality of the research" on fluoridation, Sheldon says.

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Cavity rates have declined by similar amounts in countries with and without fluoridation.

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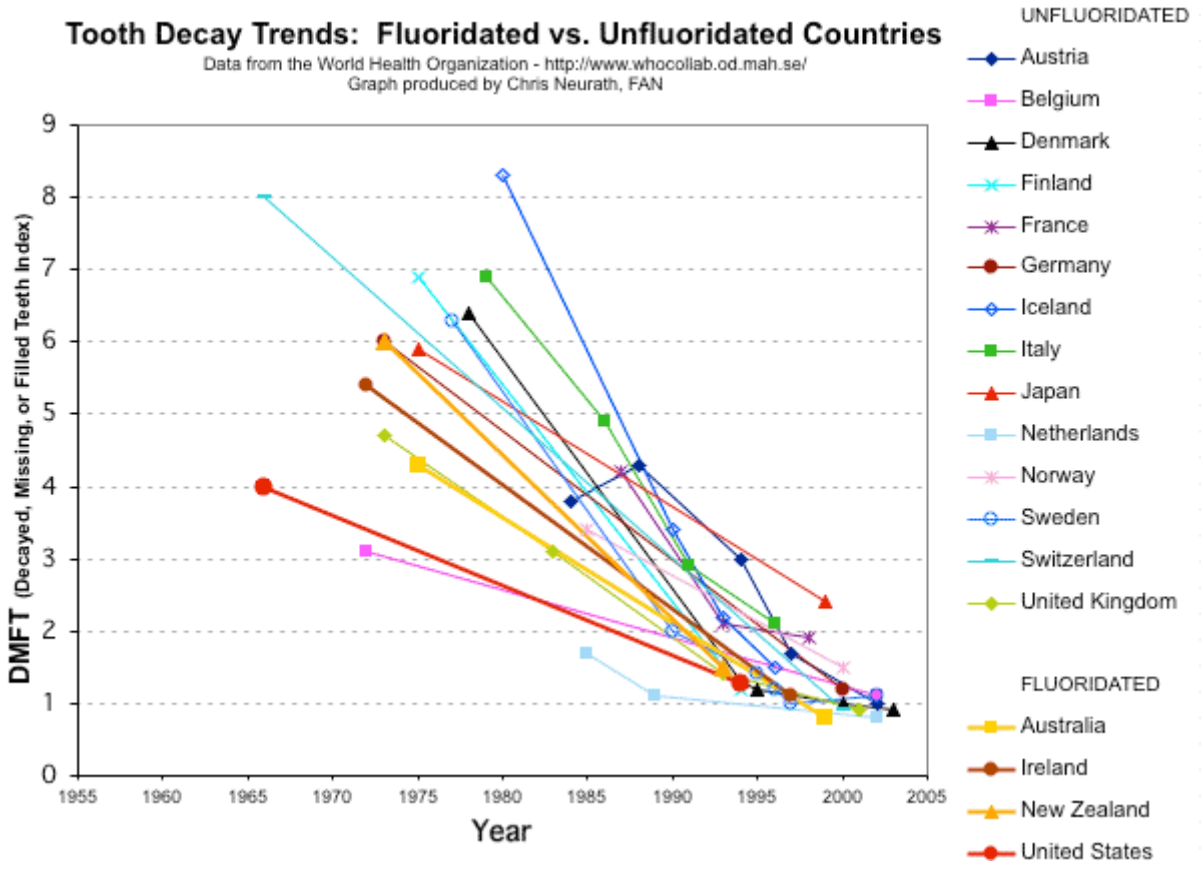
Sheldon says that if fluoridation were to be submitted anew for approval today, "nobody would even think about it" due to the shoddy evidence of effectiveness and obvious downside of fluorosis.

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The CDC and others "are somehow suspending disbelief," Sheldon says. They are "all in the mindset that this is a really good thing, and just not accepting that they might be wrong." Sheldon and others suggest pro-fluoridation beliefs are entrenched and will not easily change, despite the poor data quality and lack of evidence from the past 40 years.

Indeed, an overwhelming number of scientific studies conclude that cavity levels are falling worldwide … even in countries which don't fluoridate water.

World Health Organization Data (2004) –
Tooth Decay Trends (12 year olds) in Fluoridated vs. Unfluoridated Countries:



And the scientific literature shows that – when fluoridation of water supplies is stopped – cavities do not increase (but may in some cases actually *decrease*). See this, this, this, this, this and this.

A couple of weeks ago, the British Medical Journal reported that Americans lose a lot more of their teeththan the Brits ... even though the U.S. fluoridates a lot more of its water than the UK.

Fluoridating may water also cause reduction in IQ, depression and a variety of other illnesses.

The Guardian notes:

> Critics cite studies claiming to have identified a number of possible negative associations of fluoridation, including bone cancer in boys, bladder cancer, hypothyroidism, hip fractures and lower IQ in children.

Newsweek reports:

> A growing number of studies have suggested ... that the chemical may present a number of health risks, for example interfering with the endocrine system and increasing the risk of impaired brain function; two studies in the last few months, for example, have linked fluoridation to ADHD and underactive thyroid.

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